

WHAT IS CLAIMED IS:

1. A nucleotide having the general formula P-S-B-Sig wherein P is the phosphoric acid moiety, S the sugar or monosaccharide moiety, B being the base moiety, the phosphoric acid moiety being attached at the 3' and/or the 5' position of the sugar moiety when said nucleotide is a deoxyribonucleotide and at the 2', 3' and/or 5' position when said nucleotide is a ribonucleotide, said base being a purine or a pyrimidine, said base being attached from the N1 position or the N9 position to the 1' position of the sugar moiety when said base is a pyrimidine or a purine, respectively, and wherein said Sig is a chemical moiety covalently attached to the base B of said nucleotide, said Sig when attached to said base B being capable of signalling itself or makes itself self-detecting or its presence known.
2. A nucleotide in accordance with Claim 1 wherein said nucleotide is a deoxyribonucleotide.
3. A nucleotide in accordance with Claim 1 wherein said nucleotide is a ribonucleotide.
4. A nucleotide in accordance with Claim 1 wherein said chemical moiety Sig is chemically attached to B at the N7 position when B is a 7-deazapurine, at the C5 position when B is a pyrimidine and at the C8 position when B is a purine.

5. A nucleotide in accordance with Claim 1 wherein Sig is attached to B at a position such that an oligonucleotide or polynucleotide containing said nucleotide is capable of forming a double-stranded ribonucleic acid, a double-stranded deoxyribonucleic acid or a DNA-RNA hybrid, or when said nucleotide is incorporated into said oligonucleotide or polynucleotide.

6. A nucleotide in accordance with Claim 1 wherein Sig is attached to B at a position such that said nucleotide is capable of being incorporated into or to form a double-stranded ribonucleic acid, a double-stranded deoxyribonucleic acid or a double-stranded deoxyribonucleic acid-ribonucleic acid hybrid.

7. A nucleotide in accordance with Claim 1 wherein Sig is attached to B at a position such that when said nucleotide is incorporated into or attached to or associated with a double-stranded deoxyribonucleic acid or double-stranded ribonucleic acid or DNA-RNA hybrid, said chemical moiety Sig is capable of signalling itself or making itself self-detecting or its presence known.

8. An oligonucleotide or polydeoxyribonucleotide comprising one or more nucleotides in accordance with Claim 1.

9. An oligonucleotide or polyribonucleotide comprising one or more nucleotides in accordance with Claim 1.

10. A nucleotide in accordance with Claim 1 wherein said Sig is attached to said base B at the C5 position when said base B is a pyrimidine or at the C7 position when said base B is a deazapurine.

11. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is an aliphatic chemical moiety containing at least 4 carbon atoms.

12. A nucleotide in accordance with Claim 1 wherein said base B is a pyrimidine and wherein said Sig chemical moiety is attached to the pyrimidine at the N3 position.

13. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is an aliphatic chemical moiety containing at least 3 carbon atoms and at least one double bond.

14. A nucleotide in accordance with Claim 1 wherein said base B is a pyrimidine and wherein said Sig chemical moiety is attached to the pyrimidine at the C5 position.

15. A nucleotide in accordance with Claim 1 wherein said base B is a pyrimidine and wherein said Sig chemical moiety is attached to the pyrimidine at the C6 position.

16. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety is attached to the purine at the N1 position.

17. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety is attached to the purine at the C2 position.

18. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety is attached to the purine at the N3 position.

19. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety contains an aromatic or a cycloaliphatic group containing at least six or at least five carbon atoms, respectively.

20. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety is attached to the purine at the N7 position.

21. A nucleotide in accordance with Claim 1 wherein said base B is a purine and wherein said Sig chemical moiety is attached to the purine at the C8 position.

22. A nucleotide in accordance with Claim 1 wherein said S sugar is a pentose.

23. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is a polysaccharide or an oligosaccharide.

24. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is a sugar selected from the group consisting of triose or tetrose, or pentose, a hexose, or heptose, and an octose.

25. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is attached by or includes a glycosidic linkage moiety.

26. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is a hexose moiety.

27. A nucleotide in accordance with Claim 1 wherein said base B is a 7-deazapurine and wherein said Sig chemical moiety is attached to the 7-deazapurine at the C7 position.

28. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety comprises a component selected from the group consisting of an electron dense component, a magnetic component, an enzyme, a hormone component, a radioactive component, a metal-containing component, a fluorescing component and an antigen or antibody component.

29. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is a sugar residue and wherein said sugar is complexed with or attached to a sugar or polysaccharide binding protein.

30. A nucleotide in accordance with Claim 29 wherein said protein is a lectin.

31. A nucleotide in accordance with Claim 30 wherein said lectin is Concanavalin A.

32. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety comprises a-mannosyl residue and wherein said a-mannosyl residue is complexed with or bound to Concanavalin A.

33. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety comprises N-acetylglucosamine residue and wherein N-acetylglucosamine is complexed with or bound to wheat germ agglutinin.

34. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes an electron dense component.

35. A nucleotide in accordance with Claim 30 wherein said lectin comprises ferritin attached thereto.

36. A nucleotide in accordance with Claim 31 wherein said Concanavalin A is conjugated to ferritin.

37. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes or comprises a radioactive isotope.

38. A nucleotide in accordance with Claim 37 wherein said radioactive isotope is radioactive cobalt.

39. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes or comprises an enzyme.

40. A nucleotide in accordance with Claim 39 wherein said enzyme is alkaline phosphatase.

41. A nucleotide in accordance with Claim 39 wherein said enzyme is acid phosphatase.

42. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes or comprises a fluorescing component attached thereto.

43. A nucleotide in accordance with Claim 42 wherein said fluorescing component is fluorescein.

44. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes or comprises a magnetic component associated or attached thereto.

45. A nucleotide in accordance with Claim 44 wherein said magnetic component comprises a magnetic oxide.

46. A nucleotide in accordance with Claim 45 wherein said magnetic oxide is ferric oxide.

47. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety includes an antigenic or hapten component capable of complexing with an antibody specific to said component.

48. A single-stranded polynucleotide comprising one or more nucleotides in accordance with Claim 1.

49. A single-stranded polynucleotide in accordance with Claim 48 wherein said single-stranded polynucleotide is a polydeoxyribonucleotide.

50. A single-stranded polynucleotide in accordance with Claim 48 wherein said single-stranded polynucleotide is a polyribonucleotide.

51. A double-stranded polynucleotide comprising one or more nucleotides in accordance with Claim 1.

52. A double-stranded polynucleotide in accordance with Claim 51 wherein said double-stranded polynucleotide is a double-stranded deoxyribonucleic acid.

53. A double-stranded polynucleotide in accordance with Claim 51 wherein said double-stranded polynucleotide is a double-stranded ribonucleic acid.

54. A double-stranded polynucleotide in accordance with Claim 51 wherein said double-stranded polynucleotide is a double-stranded deoxyribonucleic acid-ribonucleic acid hybrid.

55. A polynucleotide comprising one or more nucleotides in accordance with Claim 1 coupled or attached to a polypeptide, said polypeptide having attached thereto one or more biotin groups.

56. A polynucleotide in accordance with Claim 55 wherein said polypeptide is a polylysine.

57. A polynucleotide coupled or attached to a polypeptide, said polypeptide having attached thereto one or more streptavidin units.

58. A polynucleotide terminally ligated or attached on at least one end with a polypeptide, said polypeptide having attached thereto one or more enzyme groups.

59. A single stranded polydeoxyribonucleotide coupled or attached to a polypeptide, said polypeptide having attached thereto one or more biotin groups.

60. A single-stranded polyribonucleotide coupled or attached to a polypeptide, said polypeptide having attached thereto one or more biotin groups.

61. A single-stranded polynucleotide comprising at least 12 nucleotides, at least one of said nucleotides being a nucleotide in accordance with Claim 1.

62. A polynucleotide coupled or attached to a polysaccharide.

63. A polynucleotide in accordance with Claim 62 wherein said polysaccharide has attached thereto or complexed therewith a plant binding protein.

64. A polynucleotide in accordance with Claim 63 wherein said protein is Concanavalin A.

65. A nucleotide in accordance with Claim 1 wherein said base B is cytosine.

66. A nucleotide in accordance with Claim 1 wherein said base B is uracil.

67. A nucleotide in accordance with Claim 1 wherein said base B is thymine.

68. A nucleotide in accordance with Claim 1 wherein said base B is adenine.

69. A nucleotide in accordance with Claim 1 wherein said base B is guanine.

70. A nucleotide in accordance with Claim 1 wherein said base B is 2-methyladenine.

71. A nucleotide in accordance with Claim 1 wherein said base B is 1-methylguanine.

72. A nucleotide in accordance with Claim 1 wherein said base B is 5-methylcytosine.

73. A nucleotide in accordance with Claim 1 wherein said base B is 5-hydroxymethylcytosine.

74. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety comprises a chelating agent.

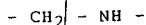
75. A nucleotide in accordance with Claim 1 wherein said base B is deazaadenine.

76. A nucleotide in accordance with Claim 1 wherein said base B is deazaguanine.

77. A nucleotide in accordance with Claim 1 wherein said Sig chemical moiety is connected to said base B via a chemical linkage.

78. A nucleotide in accordance with Claim 77 wherein said chemical linkage includes an olefinic bond at the α -position relative to base B.

79. A nucleotide in accordance with Claim 77 wherein said chemical linkage includes the moiety,



80. A nucleotide in accordance with Claim 77 wherein said chemical linkage is,



$$-CH=CH-CH_2-O-CH_2-\underset{\substack{| \\ OH}}{CH}-CH_2-NH-$$

0
"
- S - - C - O - and - O -

84. A nucleotide in accordance with Claim 39 wherein said enzyme is β -galactosidase.

86. A nucleotide in accordance with Claim 39 wherein said enzyme is horseradish peroxidase.

88. A nucleotide in accordance with Claim 42 wherein said fluorescing component is rhodamine.

89. A nucleotide in accordance with Claim 42 wherein said fluorescing component is dansyl.

90. A nucleotide in accordance with Claim 80 wherein said Sig chemical moiety is attached to the - NH - group of said chemical linkage.

91. A nucleotide in accordance with Claim 90 wherein said Sig chemical moiety comprises a polysaccharide.

92. A nucleotide in accordance with Claim 90 wherein said Sig chemical moiety is biotin.

93. A nucleotide in accordance with Claim 90 wherein said Sig chemical moiety is streptavidin.

94. A nucleotide in accordance with Claim 82 wherein said Sig chemical moiety attached to said chemical linkage is a monosaccharide.

95. A nucleotide in accordance with Claim 82 wherein said Sig chemical moiety attached to said chemical linkage is a streptavidin.

96. A polynucleotide in accordance with Claim 63 wherein said protein is a lectin.

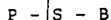
97. A polynucleotide in accordance with Claim 62 wherein said polynucleotide is terminally ligated to said polysaccharide.

98. A polyribonucleotide in accordance with Claim 60 wherein said polyribonucleotide is terminally ligated or attached to said polypeptide.

99. A polydeoxyribonucleotide in accordance with Claim 59 wherein said polydeoxyribonucleotide is terminally ligated or attached to said polypeptide.

100. A polynucleotide in accordance with Claim 55 wherein said polynucleotide is terminally ligated or attached to said polypeptide.

101. A ribonucleotide having the general formula,
Sig



wherein P is the phosphoric acid moiety, S the sugar moiety and B the base moiety, the phosphoric acid moiety being attached at the 2', 3' and/or 5' position of the sugar moiety, said base B being attached from the N1 position or the N9 position to the 1' position of the sugar moiety when said base is a pyrimidine or a purine, respectively, and wherein said Sig is a chemical moiety covalently attached to the sugar S, said Sig, when attached to said sugar S, being capable of signalling itself or making itself self-detecting or its presence known.

102. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is attached to the C2' position of said sugar moiety.

103. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is attached to the C3' position of said sugar moiety.

104. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is attached to the S sugar moiety such that an oligoribonucleotide or polyribonucleotide containing said ribonucleotide is capable of forming a double-stranded ribonucleic acid or a DNA-RNA hybrid when said ribonucleotide is incorporated into said oligoribonucleotide or said polyribonucleotide.

105. A polyribonucleotide comprising at least one ribonucleotide in accordance with Claim 101.

106. A ribonucleotide in accordance with Claim 1 wherein said base B is a pyrimidine.

107. A ribonucleotide in accordance with Claim 101 wherein said base B is a purine.

108. A ribonucleotide in accordance with Claim 101 wherein said base B is uracil.

109. A ribonucleotide in accordance with Claim 101 wherein said base B is adenine.

110. A ribonucleotide in accordance with Claim 101 wherein said base B is guanine.

111. A ribonucleotide in accordance with Claim 101 wherein said base B is cytosine.

112. A ribonucleotide in accordance with Claim 101 wherein said base B is a 7-deazapurine.

113. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is a polysaccharide or an oligosaccharide.

114. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is a monosaccharide.

115. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is a monosaccharide selected from the group consisting of triose, tetrose, pentose, hexose, heptose and octose.

116. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety is a sugar residue and wherein said sugar residue is complexed with or attached to a sugar or polysaccharide binding protein.

117. A ribonucleotide in accordance with Claim 116 wherein said protein is a lectin.

118. A ribonucleotide in accordance with Claim 117 wherein said lectin is Concanavalin A.

119. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety includes an electron dense component.

120. A ribonucleotide in accordance with Claim 119 wherein said electron dense component is ferritin.

121. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety includes or comprises a radioactive isotope component.

122. A ribonucleotide in accordance with Claim 121 wherein said radioactive isotope component is radioactive cobalt.

123. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety comprises a catalytic metal component.

124. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety includes or comprises an enzyme.

125. A ribonucleotide in accordance with Claim 124 wherein said enzyme is alkaline phosphatase.

126. A ribonucleotide in accordance with Claim 124 wherein said enzyme is β -galactosidase.

127. A ribonucleotide in accordance with Claim 124 wherein said enzyme is glucose oxidase.

128. A ribonucleotide in accordance with Claim 124 wherein said enzyme is horseradish peroxidase.

129. A ribonucleotide in accordance with Claim 124 wherein said enzyme is ribonuclease.

130. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety includes or comprises a florescing component attached thereto.

131. A ribonucleotide in accordance with Claim 130 wherein said fluorescing component is fluoroscein.

132. A ribonucleotide in accordance with Claim 130 wherein said fluorescing component is rhodamine.

133. A ribonucleotide in accordance with Claim 130 wherein said fluorescing component is dansyl.

134. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety comprises a magnetic component associated or attached thereto.

135. A ribonucleotide in accordance with Claim 134 wherein said magnetic component comprises a magnetic oxide.

136. A ribonucleotide in accordance with Claim 101 wherein said Sig chemical moiety includes an antigenic or hapten component capable of complexing with an antibody specific to said component.

137. A single stranded polyribonucleotide comprising one or more ribonucleotides in accordance with Claim 101, said single stranded polyribonucleotide comprising at least three said ribonucleotides.

138. A single stranded polyribonucleotide comprising at least twelve ribonucleotides and containing at least one ribonucleotide in accordance with Claim 101.

139. A polyribonucleotide coupled or attached to a polypeptide.

140. A polyribonucleotide in accordance with Claim 139 wherein said polypeptide is terminally attached or ligated to said polyribonucleotide.

141. A nucleotide having the general formula

Sig

P - S - B

wherein P is the phosphoric acid moiety, S the sugar moiety and B the base moiety, the phosphoric acid moiety being attached to the 3' and/or the 5' position of the sugar moiety when said nucleotide is a deoxyribonucleotide and at the 2', 3' and/or 5' position when said nucleotide is a ribonucleotide, said base B being a purine or pyrimidine, said base B being attached from the N1 position or the N9 position to the 1' position of the sugar moiety when said base B is a pyrimidine or a purine, respectively, and wherein Sig is a chemical moiety covalently attached to the phosphoric acid moiety via the chemical linkage

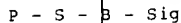
OH

- P - O - Sig,

O

said Sig, when attached to said phosphoric acid moiety P being capable of signalling itself or making itself self-detecting or its presence known.

142. A nucleotide having the general formula



wherein P is the phosphoric acid moiety, S the sugar and monosaccharide moiety, B being the base moiety, the phosphoric acid moiety being attached to the 3' and/or the 5' position of the sugar moiety when said nucleotide is deoxyribonucleotide and at the 2', 3' and/or 5' position when said nucleotide is a ribonucleotide, said base being a purine or a pyrimidine, said base being attached from the N1 position or the N9 position to the C1' position of the sugar moiety when said base is a pyrimidine or a purine, respectively, and wherein said Sig is a chemical moiety covalently attached to the base B of said nucleotide, said Sig being attached to the N⁶ or 6-amino group when said base B is adenine or the N² or 2-amino group when said base B is guanine or the N⁴ or 4-amino group when said base B is cytosine, said Sig when attached to said base B being capable of signaling itself or makes itself self-detecting or its presence known.

143. A nucleotide having the general formula P-S-B, wherein P is the phosphoric acid moiety, S the sugar or monosaccharide moiety and B the base moiety, said nucleotide having covalently attached to the P or S or B moiety a chemical moiety Sig, said Sig chemical moiety when attached to the P moiety is attached thereto via the chemical linkage,

OH

- P - O - Sig,

"

O

and when Sig is attached to the S moiety, the S moiety is a ribose group, said chemical moiety Sig when attached to said P, S or B being capable of signalling itself or makes itself self-detecting or its presence known.

144. A nucleotide in accordance with Claim 143 wherein said nucleotide is capable of being incorporated into to form a double-stranded ribonucleic acid, a double-stranded deoxyribonucleic acid or a double-stranded deoxyribonucleic acid-ribonucleic acid hybrid.

145. A nucleotide in accordance with Claim 143 wherein when said nucleotide is incorporated into or attached to a double-stranded deoxyribonucleic acid or double-stranded ribonucleic acid or DNA-RNA hybrid, said chemical moiety Sig is capable of signalling itself or making itself self-detecting or its presence known.

146. A single-stranded polynucleotide comprising one or more nucleotides in accordance with Claim 143.

147. A double-stranded polynucleotide comprising one or more nucleotides in accordance with Claim 143.

148. A single-stranded polydeoxyribonucleotide containing at least 12 nucleotides and comprising one or more nucleotides in accordance with Claim 143.

149. A nucleotide in accordance with Claim 143 wherein said Sig moiety is attached to the B base moiety through a mono- or oligosaccharide linkage.

150. A nucleotide in accordance with Claim 143 wherein said Sig moiety is monosaccharide or polysaccharide moiety attached to said B base moiety.

151. A polynucleotide comprising at least one nucleotide in accordance with Claim 143.

152. A polynucleotide comprising at least one nucleotide in accordance with Claim 149.

153. A polynucleotide comprising at least one nucleotide in accordance with Claim 150.

154. A nucleotide in accordance with Claim 143 or polynucleotide comprising at least one nucleotide in accordance with Claim 143 wherein said Sig chemical moiety comprises an agent for stimulating or inducing the production of interferon.

155. A method of chemotherapy suitable for inhibiting RNA and/or DNA synthesis which comprises administering to an organism capable of and/or functioning for the production or synthesis of DNA and/or RNA an effective DNA and/or RNA synthesis inhibiting amount of a nucleotide in accordance with Claim 143.

156. A method of chemotherapy suitable for inhibiting RNA and/or DNA synthesis which comprises administering to an organism capable of and/or functioning for the production or synthesis of DNA and/or RNA an effective DNA and/or RNA synthesis inhibiting amount of a nucleotide in accordance with Claim 1.

157. A method of chemotherapy suitable for inhibiting RNA and/or DNA synthesis which comprises administering to the organism capable of and/or functioning for the production or synthesis of DNA and/or RNA an effective DNA and/or RNA synthesis inhibiting amount of a nucleotide in accordance with Claim 101.

158. A method of chemotherapy suitable for inhibiting RNA and/or DNA synthesis which comprises administering to the organism capable of and/or functioning for the production or synthesis of DNA and/or RNA an effective DNA and/or RNA synthesis inhibiting amount of a nucleotide in accordance with Claim 141.

159. A method of chemotherapy suitable for inhibiting RNA and/or DNA synthesis which comprises administering to the organism capable of and/or functioning for the production or synthesis of DNA and/or RNA an effective DNA and/or RNA synthesis inhibiting amount of a nucleotide in accordance with Claim 142.

160. A method of chemotherapy in accordance with Claim 155 wherein the B base moiety of said nucleotide is glycosylated.

161. A method of chemotherapy in accordance with Claim 155 wherein the Sig chemical moiety of said nucleotide comprises an anti-tumor or cytotoxic agent.

162. A method for the stimulation or induction of cells for the production of lymphokines, cytokinins and/or interferon which comprises introducing into or bringing into contact with cells capable of and/or functioning for the production of said lymphokines, cytokinins and/or interferon an effective lymphokine, cytokinin and/or interferon stimulating and production inducing amount of a nucleotide in accordance with Claim 143.

163. A method for the stimulation or induction of cells for the production of lymphokines, cytokinins and/or interferon which comprises introducing into or bringing into contact with cells capable of and/or functioning for the production of said lymphokines, cytokinins and/or interferon an effective lymphokine, cytokinin and/or interferon stimulating and production inducing amount of a nucleotide in accordance with Claim 1.

164. A method for the stimulation or induction of cells for the production of lymphokines, cytokinins and/or interferon which comprises introducing into or bringing into contact with cells capable of and/or functioning for the production of said lymphokines, cytokinins and/or interferon an effective lymphokine, cytokinin and/or interferon stimulating and production inducing amount of a nucleotide in accordance with Claim 101.

165. A method for the stimulation or induction of cells for the production of lymphokines, cytokinins and/or interferon which comprises introducing into or bringing into contact with cells capable of and/or functioning for the production of said lymphokines, cytokinins and/or interferon an effective lymphokine, cytokinin and/or interferon stimulating and production inducing amount of a nucleotide in accordance with Claim 141.

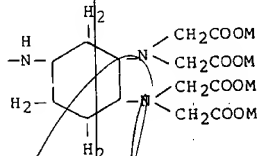
166. A method for the stimulation or induction of cells for the production of lymphokines, cytokinins and/or interferon which comprises introducing into or bringing into contact with cells capable of and/or functioning for the production of said lymphokines, cytokinins and/or interferon an effective lymphokine, cytokinin and/or interferon stimulating and production inducing amount of a nucleotide in accordance with Claim 142.

167. A polynucleotide comprising one or more nucleotides in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143, coupled or attached to a polypeptide, said polypeptide having attached thereto one or more Sig chemical moieties, said Sig when attached to said polypeptide being capable of signalling itself or making itself self-detecting or its presence known.

168. A polynucleotide coupled or attached to a polypeptide, said polypeptide having attached thereto one or more Sig chemical moieties, said Sig chemical moieties when attached to said polypeptide being capable of signalling itself or making itself self-detecting or making its presence known.

169. A nucleotide in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein said Sig chemical moiety includes a chelating agent.

170. A nucleotide in accordance with Claim 169 wherein said chelating agent includes the chemical moiety



wherein M is H or a substitutable metal.

171. A nucleotide in accordance with Claim 170 wherein said metal is magnesium or a metal replaceable by cobalt.

172. A polynucleotide containing one or more nucleotides in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein said Sig chemical moiety includes a chelating agent.

173. A polynucleotide containing a nucleotide in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein said Sig chemical moiety includes a chelating agent in accordance with Claim 170.

174. A nucleotide in accordance with Claim 170 wherein said metal is a catalytically active metal.

175. A nucleotide in accordance with Claim 170 wherein said metal is a heavy metal.

176. A nucleotide in accordance with Claim 170 wherein said metal is radioactive cobalt.

177. A nucleotide in accordance with Claim 170 wherein said metal is magnesium.

178. A ribonucleotide in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein said Sig chemical moiety includes a chelating agent.

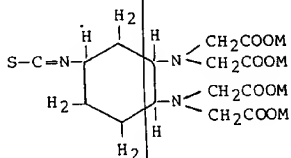
179. A deoxyribonucleotide in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein said Sig chemical moiety includes a chelating agent.

180. A nucleotide in accordance with Claim 170 wherein said metal M is a radioactive isotope.

181. A nucleotide in accordance with Claim 170 wherein said metal is platinum.

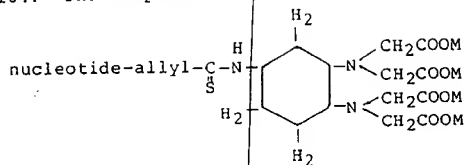
182. A nucleotide in accordance with Claim 170 wherein said M is hydrogen or a substitutable metal or a radioactive element.

183. The compound



wherein M is hydrogen or a metal.

184. The compound

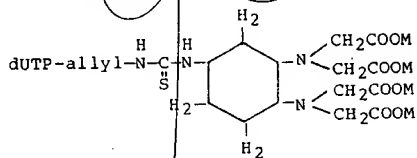


wherein M is hydrogen or a metal.

185. A compound in accordance with Claim 184 wherein said nucleotide is a deoxyribonucleotide.

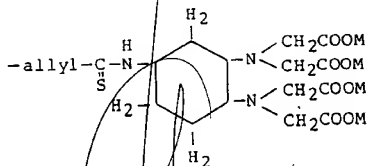
186. A compound in accordance with Claim 184 wherein said nucleotide is a ribonucleotide.

187. The compound



wherein M is hydrogen or a metal.

188. A nucleotide in accordance with Claim 1 or Claim 101 or Claim 141 or Claim 142 or Claim 143 wherein the Sig chemical moiety comprises the chemical moiety



189. A polynucleotide containing one or more nucleotides in accordance with Claim 188.

190. A polynucleotide in accordance with Claim 189 wherein said polynucleotide is a single-stranded deoxy-ribonucleotide or a single-stranded ribonucleotide or a double-stranded DNA, RNA or DNA-RNA hybrid.

191. A nucleotide in accordance with Claim 143 wherein said Sig moiety comprises a saccharide component, a protein component capable of binding to said saccharide component and a glycosylated enzyme component capable of binding to said protein component.

192. A nucleotide in accordance with Claim 191 wherein said saccharide component is a monosaccharide.

193. A nucleotide in accordance with Claim 191 wherein said saccharide component is an oligosaccharide.

194. A nucleotide in accordance with Claim 191 wherein said saccharide component is a polysaccharide.

195. A nucleotide in accordance with Claim 191 wherein said protein component is a lectin.

196. A nucleotide in accordance with Claim 191 wherein said lectin is a plant lectin selected from the group consisting of Concanavalin A, LCH lentil lectin, PSA pea lectin and BFA Vicia Faba lectin.

197. A nucleotide in accordance with Claim 191 wherein said enzyme component is an enzyme selected from the group consisting of alkaline phosphatase, acid phosphatase and horseradish peroxidase.

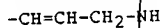
198. An amino acid or polypeptide comprising a Sig moiety attached thereto.

199. An amino acid or polypeptide in accordance with Claim 198 wherein said Sig moiety comprises a saccharide component.

200. A monosaccharide or a polysaccharide comprising a Sig moiety attached thereto.

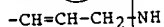
201. A monosaccharide or a polysaccharide in accordance with Claim 200 wherein said Sig moiety comprises a chelating agent.

202. A nucleotide in accordance with Claim 143 wherein said Sig moiety comprises the linkage



wherein n is an integer having a value in the range 2-10.

203. A nucleotide in accordance with Claim 143 wherein said Sig moiety comprises the linkage



wherein n is an integer having a value in the range 2-10.

add
B7

add
E5

add
22

add
H1

add
I2